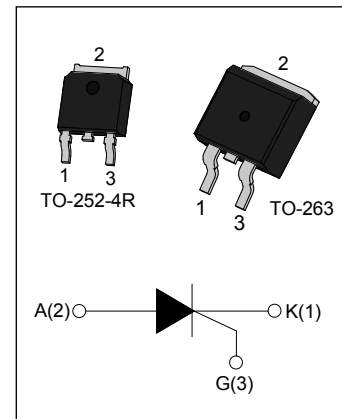




### DESCRIPTION:

With high ability to withstand the shock loading of large current, JCTx12 series of silicon controlled rectifiers provide high dv/dt rate with strong resistance to electromagnetic interference. They are especially recommended for use on solid state relay, motorcycle, power charger, T-tools etc. Packages TO-252-4R and TO-263 are RoHS compliant.(2011/65/EU)



### MAIN FEATURES

| Symbol            | JCT612      | JCT812 |
|-------------------|-------------|--------|
| $V_{DRM}/V_{RRM}$ | 600V        | 800V   |
| $I_{T(RMS)}$      | 12A         |        |
| $I_{GT}$          | $\leq 15mA$ |        |

### ABSOLUTE MAXIMUM RATINGS

| Parameter                                                           |                                  | Symbol       | Value   | Unit        |
|---------------------------------------------------------------------|----------------------------------|--------------|---------|-------------|
| Storage junction temperature range                                  |                                  | $T_{stg}$    | -40-150 | $^{\circ}C$ |
| Operating junction temperature range                                |                                  | $T_j$        | -40-150 | $^{\circ}C$ |
| Repetitive peak off-state voltage( $T_j=25^{\circ}C$ )              |                                  | $V_{DRM}$    | 600/800 | V           |
| Repetitive peak reverse voltage( $T_j=25^{\circ}C$ )                |                                  | $V_{RRM}$    | 600/800 | V           |
| RMS on-state current                                                | TO-252-4R ( $T_c=110^{\circ}C$ ) | $I_{T(RMS)}$ | 12      | A           |
|                                                                     | TO-263( $T_c=95^{\circ}C$ )      |              |         |             |
| Non repetitive surge peak on-state current ( $t_p=10ms$ )           |                                  | $I_{TSM}$    | 140     | A           |
| $I^2t$ value for fusing ( $t_p=10ms$ )                              |                                  | $I^2t$       | 98      | $A^2s$      |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ ) |                                  | $di/dt$      | 50      | $A/\mu s$   |
| Peak gate current                                                   |                                  | $I_{GM}$     | 4       | A           |
| Average gate power dissipation                                      |                                  | $P_{G(AV)}$  | 1       | W           |
| Peak gate power                                                     |                                  | $P_{GM}$     | 5       | W           |

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol   | Test Condition                                                  | Value |      |      | Unit             |
|----------|-----------------------------------------------------------------|-------|------|------|------------------|
|          |                                                                 | MIN.  | TYP. | MAX. |                  |
| $I_{GT}$ | $V_D=12\text{V}$ $R_L=33\Omega$                                 | -     | -    | 15   | mA               |
| $V_{GT}$ |                                                                 | -     | -    | 1.5  | V                |
| $V_{GD}$ | $V_D=V_{DRM}$ $T_j=150^{\circ}\text{C}$ $R_L=3.3\text{K}\Omega$ | 0.2   | -    | -    | V                |
| $I_L$    | $I_G=1.2I_{GT}$                                                 | -     | -    | 60   | mA               |
| $I_H$    | $I_T=500\text{mA}$                                              | -     | -    | 50   | mA               |
| $dV/dt$  | $V_D=2/3V_{DRM}$ Gate Open $T_j=150^{\circ}\text{C}$            | 200   | -    | -    | V/ $\mu\text{s}$ |

**STATIC CHARACTERISTICS**

| Symbol    | Parameter                                |                           | Value(MAX) | Unit             |
|-----------|------------------------------------------|---------------------------|------------|------------------|
| $V_{TM}$  | $I_{TM}=24\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.55       | V                |
| $V_{TO}$  | Threshold voltage                        | $T_j=150^{\circ}\text{C}$ | 0.85       | V                |
| $R_d$     | Dynamic resistance                       | $T_j=150^{\circ}\text{C}$ | 30         | $\text{m}\Omega$ |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$              | $T_j=25^{\circ}\text{C}$  | 5          | $\mu\text{A}$    |
| $I_{RRM}$ |                                          | $T_j=150^{\circ}\text{C}$ | 2          | mA               |

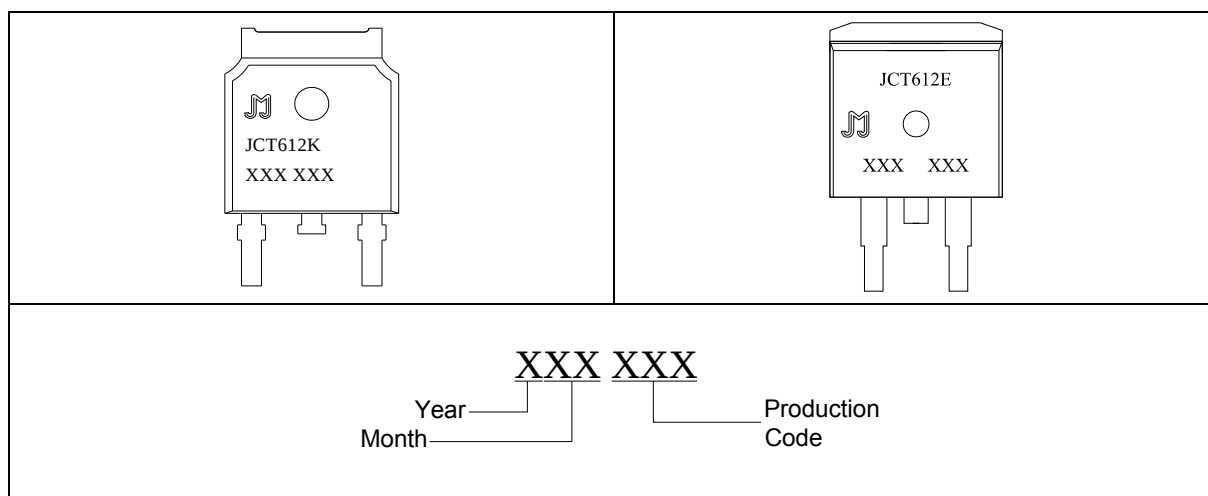
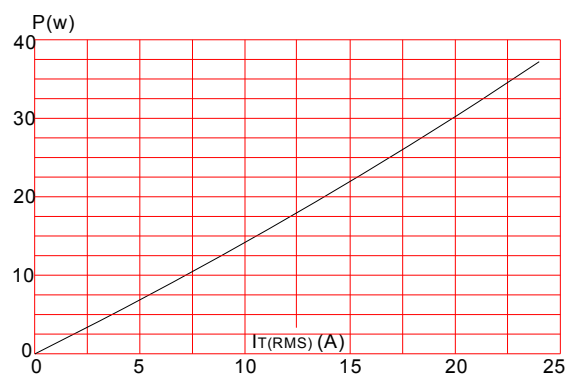
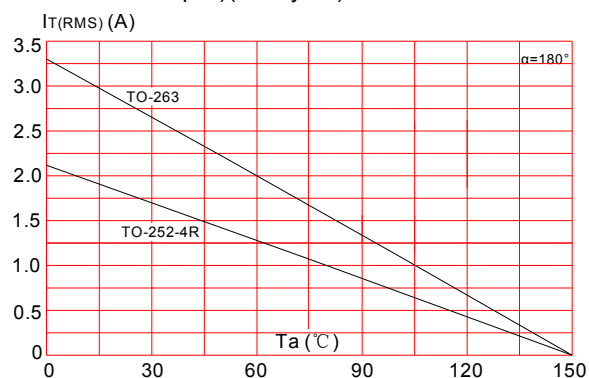
**THERMAL RESISTANCES**

| Symbol        | Parameter            |           | Value | Unit                        |
|---------------|----------------------|-----------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case(AC) | TO-252-4R | 1.8   | $^{\circ}\text{C}/\text{W}$ |
|               |                      | TO-263    | 2.8   |                             |
| $R_{th(j-a)}$ | junction to ambient  | TO-252-4R | 70    | $^{\circ}\text{C}/\text{W}$ |
|               |                      | TO-263    | 45    |                             |

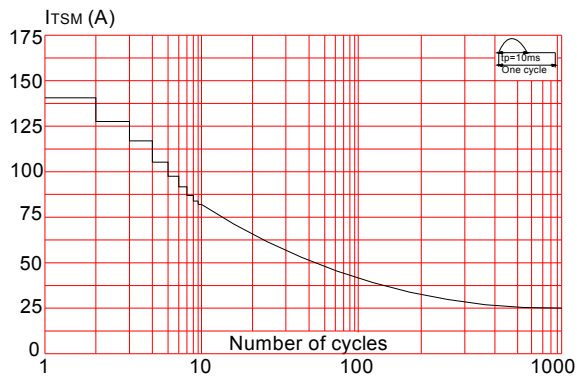
## ORDERING INFORMATION

|                                 |                                                                  |          |                 |                         |                                |
|---------------------------------|------------------------------------------------------------------|----------|-----------------|-------------------------|--------------------------------|
| <b>J</b>                        | <b>CT</b>                                                        | <b>6</b> | <b>12</b>       | <b>E</b>                | <b>-TR</b>                     |
| JieJie Microelectronics Co.,Ltd | SCRs                                                             |          |                 | E:TO-263<br>K:TO-252-4R | Blank: Tube<br>TR: Tape & Reel |
|                                 | 6: $V_{DRM}/V_{RRM} \geq 600V$<br>8: $V_{DRM}/V_{RRM} \geq 800V$ |          | $I_T(RMS): 12A$ |                         |                                |

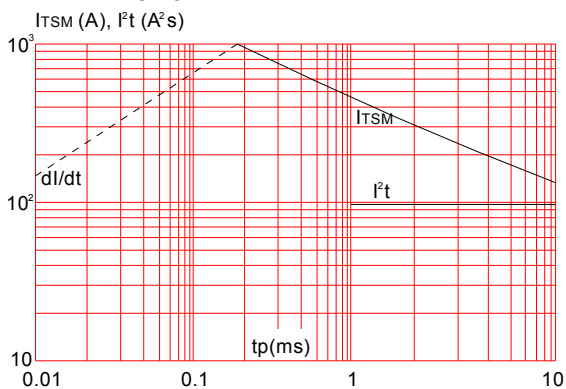
## MARKING


**FIG.1:** Maximum power dissipation versus RMS on-state current

**FIG.2:** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness:35 $\mu m$ )(full cycle)


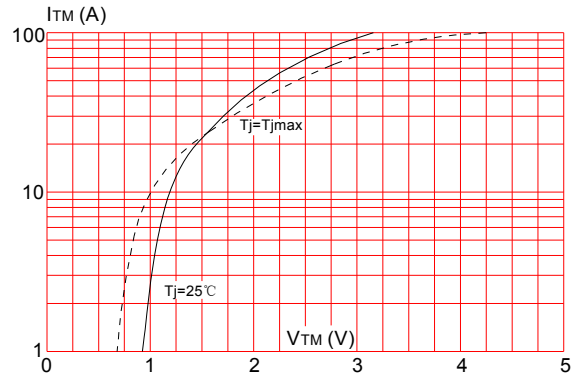
**FIG.3:** Surge peak on-state current versus number of cycles



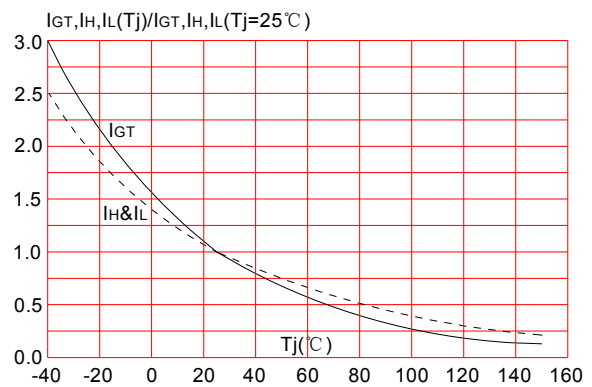
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2t$  ( $di/dt < 50\text{A}/\mu\text{s}$ )



**FIG.4:** On-state characteristics (maximum values)

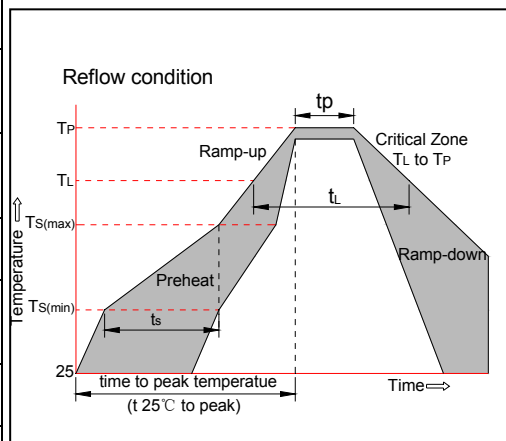


**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature



## SOLDERING PARAMETERS

|                                                           |                                      |                                           |
|-----------------------------------------------------------|--------------------------------------|-------------------------------------------|
| Reflow Condition                                          |                                      | Pb-Free assembly<br>(see figure at right) |
| Pre Heat                                                  | -Temperature Min<br>( $T_{s(min)}$ ) | +150°C                                    |
|                                                           | -Temperature<br>Max( $T_{s(max)}$ )  | +200°C                                    |
|                                                           | -Time (Min to Max)<br>( $t_s$ )      | 60-180 secs.                              |
| Average ramp up rate<br>(Liquidus Temp ( $T_L$ ) to peak) |                                      | 3°C/sec. Max                              |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                      |                                      | 3°C/sec. Max                              |
| Reflow                                                    | -Temperature( $T_L$ )<br>(Liquidus)  | +217°C                                    |
|                                                           | -Temperature( $t_L$ )                | 60-150 secs.                              |
| Peak Temp ( $T_P$ )                                       |                                      | +260(+0/-5)°C                             |
| Time within 5°C of actual<br>Peak Temp ( $t_P$ )          |                                      | 20-40secs.                                |
| Ramp-down Rate                                            |                                      | 6°C/sec. Max                              |
| Time 25°C to Peak Temp ( $T_P$ )                          |                                      | 8 min. Max                                |
| Do not exceed                                             |                                      | +260°C                                    |



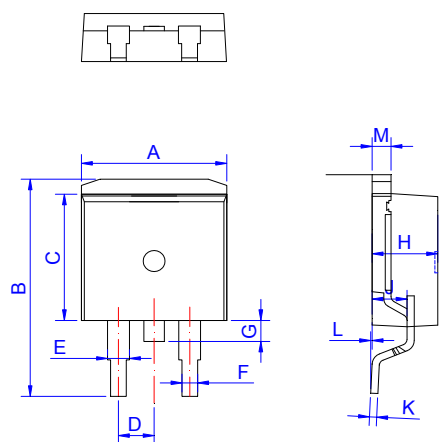
## ORDERING INFORMATION

| Order code      | Voltage<br>V <sub>DRM</sub> /V <sub>RRM</sub> (V) | IGT(mA) | Package   | Base qty.<br>(pcs) | Delivery<br>mode |
|-----------------|---------------------------------------------------|---------|-----------|--------------------|------------------|
| JCT612K/JCT812K | 600/800                                           | 15      | TO-252-4R | 80                 | Tube             |
|                 |                                                   |         |           | 2,500              | Tape & Reel      |
| JCT612E/JCT812E |                                                   |         | TO-263    | 50                 | Tube             |
|                 |                                                   |         |           | 800                | Tape & Reel      |

**Document Revision History**

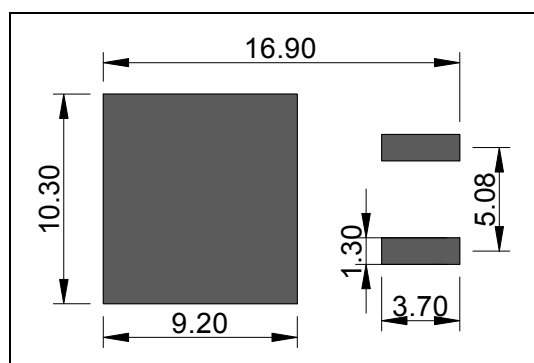
| Date          | Revision | Changes            |
|---------------|----------|--------------------|
| June 12, 2021 | 10       | Last update        |
| Nov 8, 2021   | 11       | Add Vto & Rd value |

## PACKAGE MECHANICAL DATA

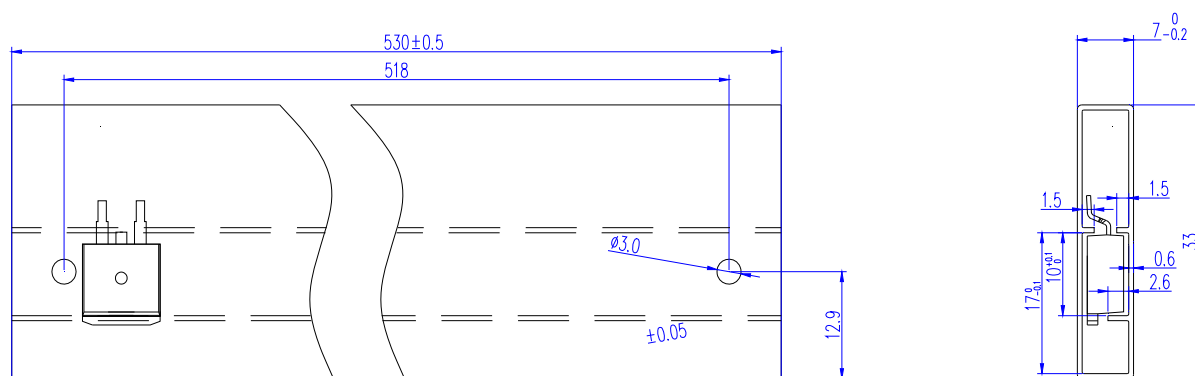


| Ref. | Dimensions  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 9.90        |      | 10.20 | 0.390  |       | 0.402 |
| B    | 14.70       |      | 15.80 | 0.579  |       | 0.622 |
| C    | 9.4         |      | 9.6   | 0.37   |       | 0.378 |
| D    |             | 2.54 |       |        | 0.100 |       |
| E    | 1.20        |      | 1.40  | 0.047  |       | 0.055 |
| F    | 0.75        |      | 0.85  | 0.029  |       | 0.033 |
| G    |             |      | 1.75  |        |       | 0.069 |
| H    | 4.40        |      | 4.70  | 0.173  |       | 0.185 |
| J    | 2.30        |      | 2.70  | 0.091  |       | 0.106 |
| K    | 0.38        |      | 0.55  | 0.015  |       | 0.022 |
| L    | 0           | 0.10 | 0.25  | 0      | 0.004 | 0.010 |
| M    | 1.25        |      | 1.35  | 0.049  |       | 0.053 |

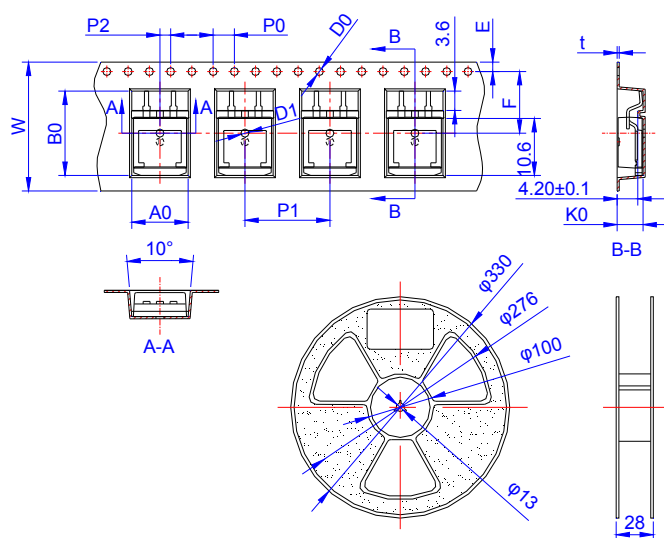
## FOOTPRINT-TO-263 (dimensions in mm)



## DELIVERY MODE



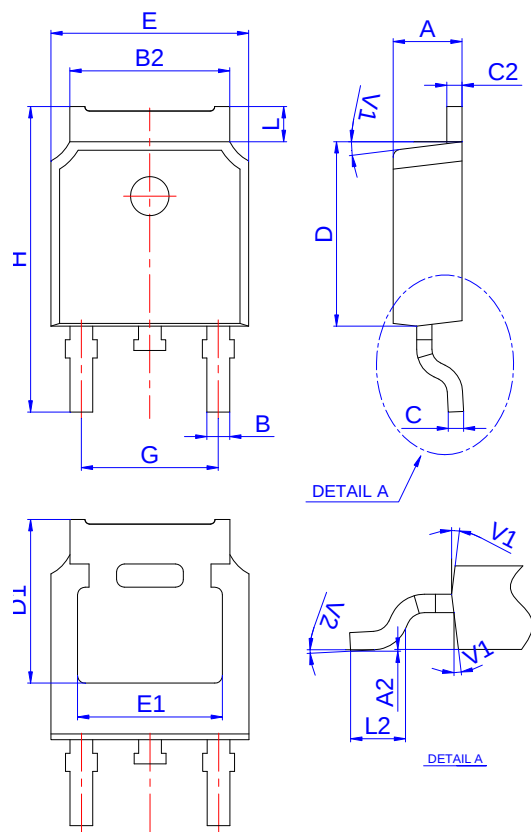
| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---------|---------|------------|-----------------|------------|
| TO-263  | TUBE    | 50         | 1,000           | 5,000      |



| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | 23.70       | 24.00 | 24.30 | 0.933  | 0.945 | 0.957 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 11.40       | 11.50 | 11.60 | 0.449  | 0.453 | 0.457 |
| D0   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| D1   | -           | 1.50  | 1.60  | -      | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 15.90       | 16.00 | 16.10 | 0.626  | 0.630 | 0.634 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| A0   | 10.80       | 10.90 | 11.00 | 0.425  | 0.429 | 0.433 |
| B0   | 16.20       | 16.30 | 16.40 | 0.638  | 0.642 | 0.646 |
| K0   | 4.80        | 4.90  | 5.00  | 0.189  | 0.193 | 0.197 |
| t    | 0.35        | 0.40  | 0.45  | 0.014  | 0.016 | 0.018 |

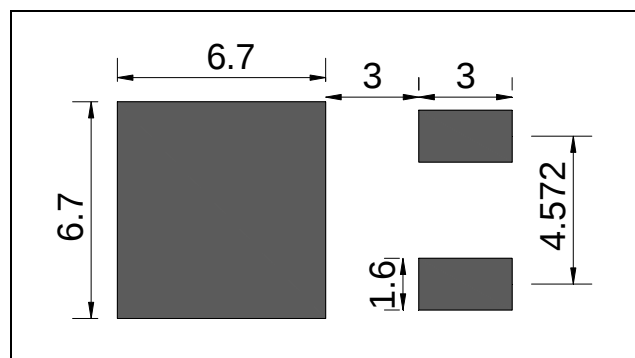
| PACKAGE | OUTLINE | REEL (PCS) | PER CARTON (PCS) | TAPE & REEL |
|---------|---------|------------|------------------|-------------|
| TO-263  | TAPING  | 800        | 4,000            | 13 inch     |

## PACKAGE MECHANICAL DATA

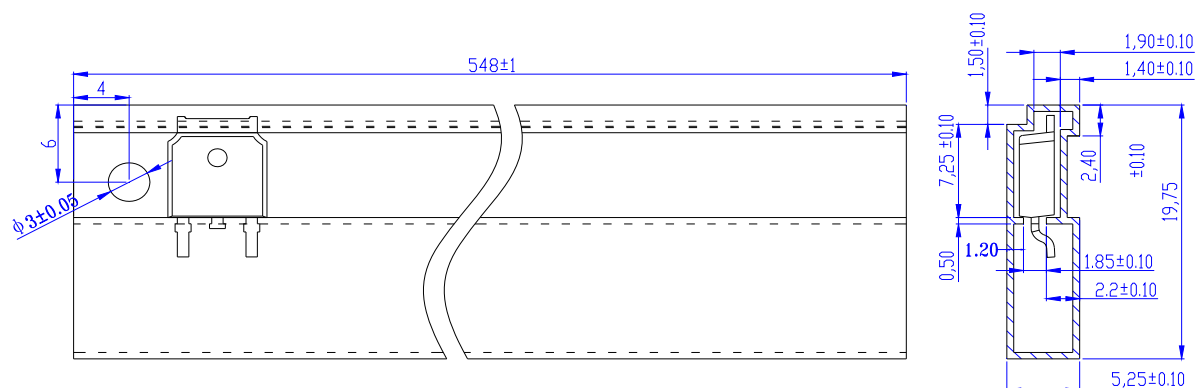


| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.10        |      | 2.50  | 0.083    |      | 0.098 |
| A2   | 0           |      | 0.10  | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.18        |      | 5.48  | 0.202    |      | 0.216 |
| C    | 0.40        |      | 0.60  | 0.016    |      | 0.024 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.90        |      | 6.30  | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.209REF |      |       |
| E    | 6.40        |      | 6.80  | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.47        |      | 4.67  | 0.176    |      | 0.184 |
| H    | 9.50        |      | 10.70 | 0.374    |      | 0.421 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

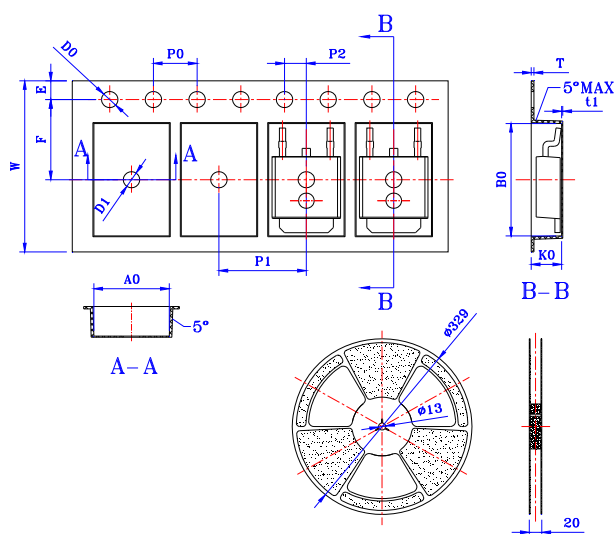
## FOOTPRINT-TO-252-4R (dimensions in mm)



## DELIVERY MODE



| PACKAGE   | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|-----------|---------|------------|-----------------|------------|
| TO-252-4R | TUBE    | 80         | 4,000           | 20,000     |



| Ref. | Dimensions  |       |       |        |       |       |
|------|-------------|-------|-------|--------|-------|-------|
|      | Millimeters |       |       | Inches |       |       |
|      | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| W    | 15.90       | 16.00 | 16.10 | 0.626  | 0.630 | 0.634 |
| E    | 1.65        | 1.75  | 1.85  | 0.065  | 0.069 | 0.073 |
| F    | 7.40        | 7.50  | 7.60  | 0.291  | 0.295 | 0.299 |
| D0   | 1.40        | 1.50  | 1.60  | 0.055  | 0.059 | 0.063 |
| D1   | 1.40        | 1.50  | 1.60  | 0.055  | 0.059 | 0.063 |
| P0   | 3.90        | 4.00  | 4.10  | 0.154  | 0.157 | 0.161 |
| P1   | 7.90        | 8.00  | 8.10  | 0.311  | 0.315 | 0.319 |
| P2   | 1.90        | 2.00  | 2.10  | 0.075  | 0.079 | 0.083 |
| 10P0 | 39.80       | 40.00 | 40.20 | 1.567  | 1.575 | 1.583 |
| A0   | 6.85        | 6.90  | 7.00  | 0.270  | 0.272 | 0.276 |
| B0   | 10.45       | 10.50 | 10.60 | 0.411  | 0.413 | 0.417 |
| K0   | 2.68        | 2.78  | 2.88  | 0.106  | 0.109 | 0.113 |
| T    | 0.24        | —     | 0.27  | 0.009  | —     | 0.011 |
| t1   | 0.10        | —     | —     | 0.004  | —     | —     |

| PACKAGE   | OUTLINE | REEL (PCS) | PER CARTON (PCS) | TAPE & REEL |
|-----------|---------|------------|------------------|-------------|
| TO-252-4R | TAPING  | 2,500      | 25,000           | 13 inch     |



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